

**AMENDMENT IN RESPONSE TO
NOTICE OF NON-COMPLIANT AMENDMENT
Patent Application Serial No. 09/698,558
Reply to Office Action Mailed December 17, 2003
Art Unit: 3725**

Attorney Docket No.: Case 6103

AMENDMENTS TO THE SPECIFICATION

✓
On page 5, please replace the paragraphs spanning lines 6 through 20 with the following amended paragraphs:

Yet still another object of the present invention is to provide a top grinding ring with "heavy duty" guide vanes (flutes) sufficient to dampen the centrifugal forces that allow the balls to partially leave their original track, thereby reducing damage to, and premature failures of, top and bottom grinding rings, balls, springs, housing units and main shafts.

B/ Still another object of the present invention is to provide a top and bottom grinding ring with an improved tolerance "deep dish" ball track contour which will increase the useable wear life of the top and bottom grinding ring and other components in a type EL coal pulverizer when an all-metal snubber is either not required or desired.

A still further object of the present invention is to provide a top grinding ring with "heavy duty" guide vanes (flutes) and a top and bottom grinding ring with an improved tolerance "deep dish" ball track contour, as mentioned above, for reducing damage to, and premature failures of, top and bottom grinding rings, balls, springs, housing units and main shafts when an all-metal snubber is either not required or desired.

Yet still another object of the present invention is to provide a new grinding wear part profile which will increase the useable wear life by means of larger diameter balls with matching grinding ring profiles in a type EL coal pulverizer, and which can be utilized either with or without the all-metal snubber mentioned above.

AMENDMENT IN RESPONSE TO
NOTICE OF NON-COMPLIANT AMENDMENT
Patent Application Serial No. 09/698,558
Reply to Office Action Mailed December 17, 2003
Art Unit: 3725

Attorney Docket No.: Case 6103

[On pages 7 and 8, please replace the paragraphs starting at page 7, line 4 to page 8, line 24, with the following amended paragraphs:]

B1
The outside diameter of the upper grinding ring 18 comprises "flutes" 26, which provide primary circulation of partially ground coal in the grinding wear parts, and which also provide tracking forces to the pulverizer balls 14 to allow concentric rotation and orbiting of the balls 14 in the track of the upper grinding ring 18 and lower grinding ring 16. However, when inadequate dual-purpose spring 24 forces exist, or excessive movement of the top grinding ring 18 is present, or the centrifugal force of the balls 14 is not limited, conditions have proven favorable to cause material to be chipped off the outside diameter (OD) of the top and bottom grinding rings 18 and 16, spalling of material off the [balls' surface 14] surface of balls 14, uneven wear patterns in the top and bottom grinding ring 18 and 16, and indirect failures of the dual-purpose springs 24, flutes 26, and gearbox main shaft 22.

Figs. 2 [[&]] and 3 illustrate a prior art snubber design which was used to limit radial movement of the top grinding ring 18. These known snubbers, generally referred to as 27, were either bolted or welded to the top grinding ring 18 by means of soft steel inserts 36 embedded into the hard, wear-resistant parent material of the top grinding ring 18. The prior art design included a plurality of snubbers 27, typically four in number, located and equally spaced around the circumference of the pulverizer housing 12. Each snubber 27 comprised a snubber bracket 28 attached to the pulverizer housing 12, a snubber block 30, a snubber frame 32 attached to the existing top grinding ring 18 with necessary fasteners, and a snubber shim pack 34 that allowed the clearance between the snubber block 30 and snubber bracket 28 to be reduced.

**AMENDMENT IN RESPONSE TO
NOTICE OF NON-COMPLIANT AMENDMENT
Patent Application Serial No. 09/698,558
Reply to Office Action Mailed December 17, 2003
Art Unit: 3725**

Attorney Docket No.: Case 6103

As will be seen from Figs. 2 and 3, there was no means to provide limits to the circumferential rotation of the top grinding ring 18 with the previous [snubber] snubbers 27, since they were oriented and designed to resist forces along a radial line extending outwardly from the center of rotation of the pulverizer main shaft 22 which drives the bottom grinding ring 16. Furthermore, as the attachment of the snubber frame 32 to the top grinding ring 18 proved failure-prone, and as the radial gap between the snubber block 30 and snubber bracket 28 increased from wear, the contact force between the top grinding ring 18, snubber frame 32, and snubber bracket 28 became excessive. This resulted in premature failure of these and other internal parts, requiring expensive and premature mill rebuilds and problems with the availability and reliability of the coal pulverizer 10.

Referring now to Figs. 4 [[&]] and 5, and according to the present invention, several improvements will be seen in the design and arrangement of the pulverizer grinding elements or wear parts. First, there is provided a new design and configuration of the bottom grinding ring, generally referred to as 50, which is provided with an improved tolerance "deep dish" ball track contour 51. Next, there is provided a new design and configuration of the top grinding ring, generally referred to as 52, having "heavy duty" guide vanes (flutes) 53 and which is also provided with an improved tolerance "deep dish" ball track contour 51. Finally, there is provided a new design and configuration of an all-metal snubber, generally referred to as 57, which is preferably formed or cast as part of the parent material of the improved top grinding ring casting 52 as a contour change on [anouter] an outer edge thereof, i.e., as an integral part. As illustrated in Fig. 5, a plurality of such OD contour changes 55 inherent to the parent casting are provided; the number of snubbers 57 is typically three in number, equally spaced around the circumference of the top grinding ring 52, as opposed to the four snubbers 27 of the prior art. If required,

**AMENDMENT IN RESPONSE TO
NOTICE OF NON-COMPLIANT AMENDMENT
Patent Application Serial No. 09/698,558
Reply to Office Action Mailed December 17, 2003
Art Unit: 3725**

Attorney Docket No.: Case 6103

additional snubbers 57 may be provided, again equally spaced around the circumference of the top grinding ring 52.

B
To attach the integral snubber 57 to the pulverizer housing 12, a matching number of snubber brackets 54 are provided which attach to the pulverizer housing 12 and which match the orientation of the integral snubbers 57 formed as contour changes 55 in the improved top grinding ring 52. Snubber wear plates 56 and shim packs 58, adapted to the new design configuration of the integral snubber 57, are also provided [to provide] as means for adjusting or eliminating clearance therebetween as required during field [installation..] installation.